No. 613,818. Patented Nov. 8, 1898.

C. L. IRELAND.

METALLIC MATRIX FOR LINOTYPE MACHINES.

(Application filed Dec. 31, 1897.)

(No Model.)

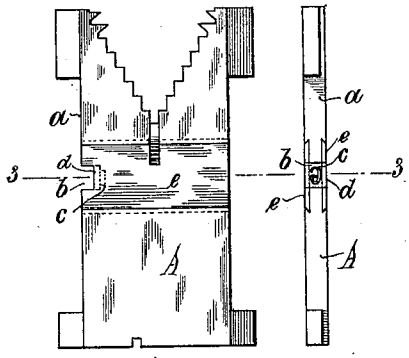

Fig. 1. Fig. 2.

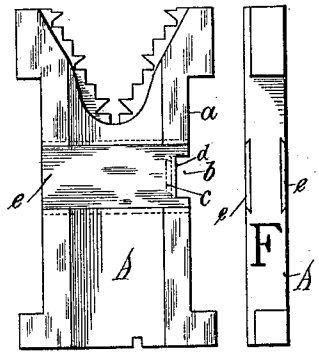

Fig. 4. Fig. 5.

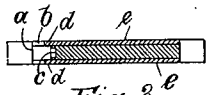

Fig. 3.

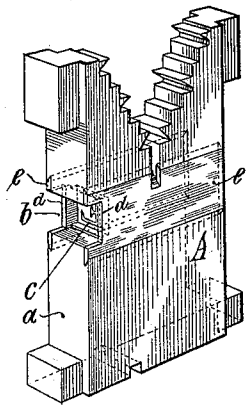

Fig. 6.

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METALLIC MATRIX FOR LINOTYPE-MACHINES.

SPECIFICATION forming part of Letters Patent No. 613,818, dated November 8, 1898.

Application filed December 31, 1897. Serial No. 665,078. (No model.)

To all whom it may concern:

Be it known that I, CHARLES LEWIS IRELAND, a subject of the Queen of the United Kingdom of Great Britain and Ireland, residing at Manchester, England, have invented certain new and useful Improvements in the Metallic Matrices of Linotype-Machines, (for which I have obtained the following patent in Great Britain and Ireland, No. 9,732, dated May 16, 1895;) and I do hereby declare that the following is a full, clear, and exact description of the invention, reference being made to the accompanying drawings, which are to be taken as part of this specification and read therewith, and one which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in the metallic matrices of the well-known Mergenthaler linotype-machine, as well as in those of any linotype-machine which are exposed to the damage hereinafter defined. The Mergenthaler linotype-machine and its matrices are fully described in the specification of Letters Patent No. 436,532, of 1890.

The special object of the improvements above mentioned is to obviate certain damage which is done to the matrices by their fellows during the process of assemblage. The damage in question is caused under the circumstances and is of the nature next described. The indentation or matrix proper in the formative edge of the matrix body is formed by punching or engraving the said body edge on. The material of the matrix is brass, because that metal possesses the properties of softness and hardness in the desired degrees, respectively. Either process leaves the side walls of the indentation thin and weak. A linotype-matrix is sent foot first and in an oblique direction toward the place of assemblage. It is there turned up into a vertical position and in that position presents one side to the foot of the following matrix, which strikes a blow across such side, the portion struck including one of the side walls above mentioned. This wall is indented and finally broken down. A further cause of damage to the side walls is that due to the accidental adherence of small fragments of type-metal to the sides of the spacers. In the operation of clamping prior to the injection of the molten metal the presence of a small fragment of hard metal between a matrix and a spacer necessarily puts a severe pressure on the matrix at that point, whereby the matrix is liable to be damaged, and in the event of the fragment pressing against the side wall above mentioned the said wall is liable to be broken down. Both walls are further exposed to wear and tear. When the damaged matrices are assembled and clamped in the vise, there is a space between the indentations of the adjacent ones. In the act of casting molten metal is injected into all the spaces, thereby forming fins upon the same edge of the linotype as are the printing characters, which fins are high enough to take ink, and will, consequently, print lines between the printed letters.

The present invention consists in substituting strong side walls for the weak ones above mentioned. These substitute side walls are plates of steel or other equally hard metal. These plates are permanently combined with the metallic matrix after the absence from the latter of a mass of material of the same size as each substitute side wall has been provided for. Thus the substitute side walls may be parts of plates of the same area as the sides of the metallic matrix to which they are to be attached, but they must be as large as the side walls of the indentation plus as much as suffices to provide for their being combined with the respective sides of the said matrix.

Referring to the accompanying drawings, Figure 1 is a side elevation of a linotype-matrix embodying the present invention, taken from the left hand of the operator. Fig. 2 is a rear elevation of it, taken from the left hand of Fig. 1. Fig. 3 is a horizontal section taken along the line 3 3 of Figs. 1 and 2. Fig. 4 is a side elevation of a linotype-matrix, also embodying the present invention, taken from the right hand of the operator. Fig. 5 is a front elevation of the same matrix. Fig. 6 is a perspective view of the same matrix, showing the top, the rear edge, and the side to the left hand of the operator.

The terms "rear," "front," "left hand," and "right hand" are used in respect of the

assembled and clamped position of the matrices in the vise.

A is the body of the matrix. *a* is the formative and rear edge of it. *b* is a rectangular notch in the said edge and forms a portion of the mold of the body of the linotype.

c is the indentation or matrix proper, being that part of the matrix which is formed by the process of punching or engraving.

d d are the substitute side walls. The material of them has been already specified. In respect of position the outer face of each one stands flush with the respective side of the matrix-body A, extends laterally as far as the bottom of the notch *b*, and vertically as far as the (at least) top and bottom edges of the indentation *c*. As to the thickness of a side wall, the hardness of the material, as compared with that of brass, permits of it being either as thin as heretofore and therefore stronger or as strong and therefore thinner and with a corresponding diminution of the maximum thickness of the matrix-body.

The position and minimum dimensions of a substitute side wall being as above there now remains to be considered the means by which it is to be incorporated with and held to the matrix-body A. On this point the present invention imposes no limits beyond requiring that the means be sound and workmanlike, note being taken of the above-mentioned wear to which one side wall is subjected during the process of assemblage. The blow on the right-hand substitute side wall is delivered horizontally across the matrix-body. Now, if there are two different metals side by side under that blow they will be set vibrating at, most likely, dissimilar rates, whereby a tendency to disruption along their contacting edge will be established. I therefore consider it preferable that the substitute wall on that side of the matrix-body should be a portion of a plate *e*, extending the whole width of the said body, so that there shall be only one metal to receive the blow. As to holding the said plate to the matrix-body, I do it by cutting a transverse groove across the matrix-body A as deep as the plate *e* is thick, undercutting the top and bottom edges of the groove and beveling the corresponding edges of the plate to engage therein. The substitute side wall on the opposite side of the matrix-body may be incorporated with and held to the latter in the same way and is illustrated in the figures as being so dealt with.

I am aware that the use of a compound matrix of copper and steel has been proposed as an improvement in the old method of casting single type, in which the copper matrix formed a removable bottom to the mold and was clamped against it. In punching the impression on these copper matrices an inequality of the marginal surfaces was produced by the displacement of metal, whereby the close contact of matrix and mold was prevented and a lateral bur was formed on the cast type which prevented its proper assemblage and alinement. To prevent the formation of this bur and to obviate the necessity of "rubbing" the type, it was proposed to remove the lateral margins of copper on either side of the punched indentation and replace them by strips of hard metal, the hard metal and copper portions being then riveted together. According to my invention I provide an armored surface to a linotype-matrix at the point where it receives a lateral blow from the matrix following and prevent the consequent breakdown of the side walls and the formation of fins on the printing-bar in the process of casting, and I would have it understood that I do not claim the application of hard metallic surfaces to type-matrices generally, but only in the particular manner and for the particular purpose described.

I claim—

1. The combination in separable matrices for linotype and similar machines, of the hard metallic surfaces applied in the manner described for the purpose of withstanding, in the process of assemblage, the lateral blow delivered by the following matrix.

2. In a matrix for a linotype-machine, the body having the indentation or matrix proper in its edge, in combination with the side walls of steel or similar hard material extending across said matrix, substantially in the manner described.

3. In a linotype-matrix, having the indented matrix or character proper in its edge, the inserted side plates of hard material, having the notches *d* in their forward edges, substantially as described.

In witness whereof I have hereunto affixed my signature, in presence of two witnesses, this 11th day of March, 1896.

CHARLES LEWIS IRELAND.

Witnesses:
FRANCIS I. JACKSON,
W. H. BURLVIC.